SKPOS®

Nearest reference station and BeiDou-3 tests within SKPOS

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EUPOS

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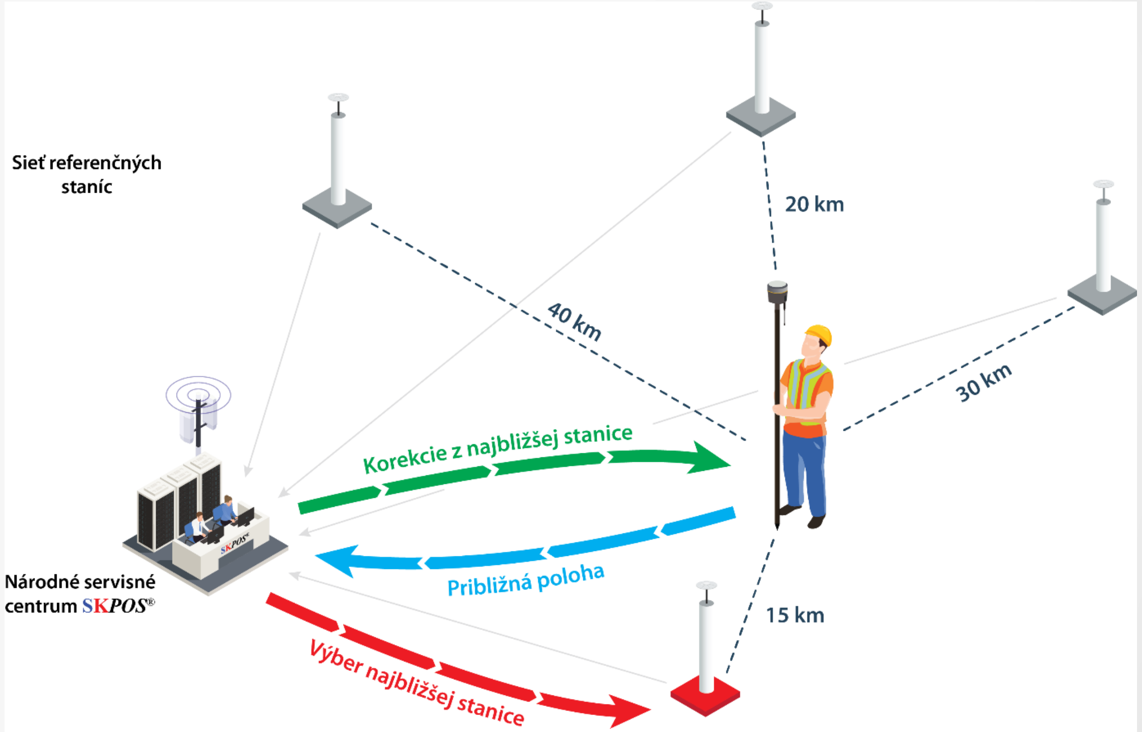
SKPOS
Nearest Reference Station concept

- **2006**
  VRS concept
- **2024**
  Nearest reference stations concept

- larger number of satellites
- lower computing power of the control software
- automatic selection of the nearest station
- don’t lose information about rover’s position

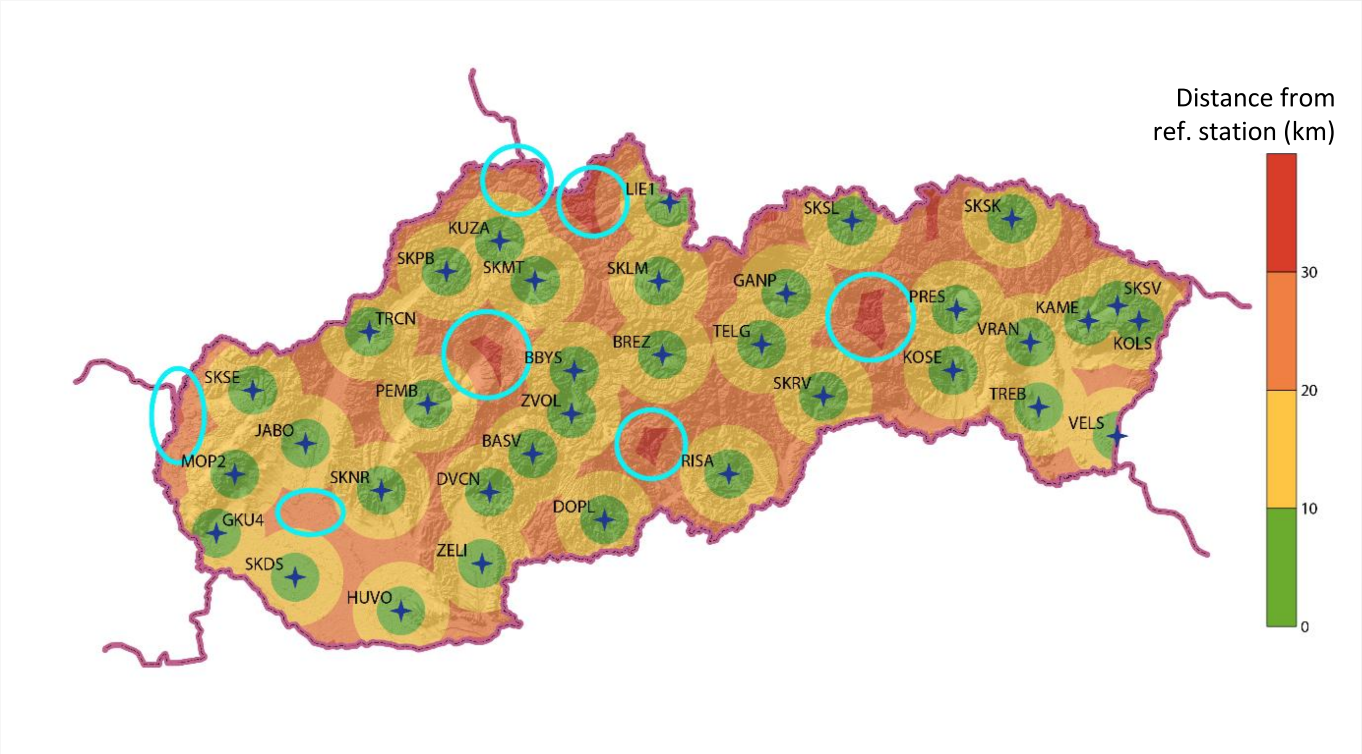
- reliability up to 20 km from the nearest station
- user need to check the status of reference stations



Nearest Reference Station concept

Test on National Spatial Network points

- 7 locations farthest from reference stations
- 38 National Spatial Network points
- VRS concept vs Nearest Reference Station
- RTK measurement with 2 minutes observation
- GPS, GLONASS, Galileo, BeiDou
- RTCM 3.2 MSM5
- various measuring conditions



Nearest Reference Station concept

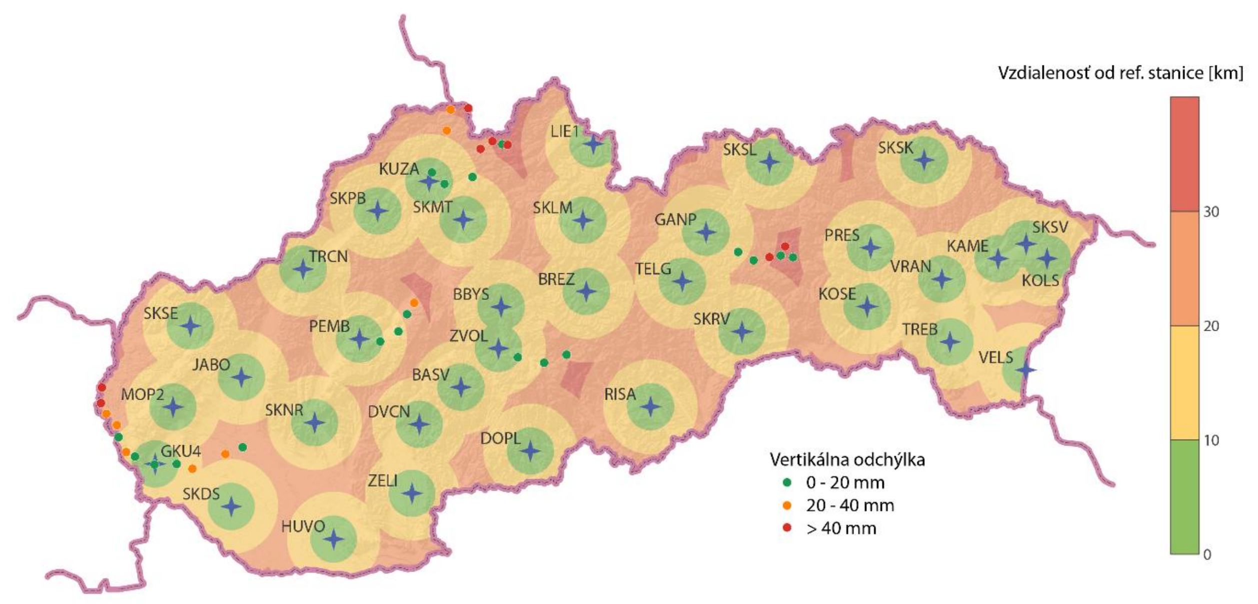
Test on National Spatial Network points

	VRS	Nearest Reference Station
Initialization time	13 s	11 s
Number of satellites	19	24
Average PDOP	1.4	1.2
Average horizontal deviation	18 mm	21 mm
Average vertical deviation	24 mm	29 mm
Maximal horizontal deviation	70 mm	110 mm
Maximal vertical deviation	85 mm	166 mm

Nearest Reference Station concept

Test on National Spatial Network points

Distance from the reference station	Horizontal deviation		Vertical deviation	
	Average	Maximal	Average	Maximal
0 – 10 km	19 mm	33 mm	7 mm	11 mm
10 – 20 km	23 mm	59 mm	15 mm	40 mm
20+ km	18 mm	**110 mm**	29 mm	**166 mm**



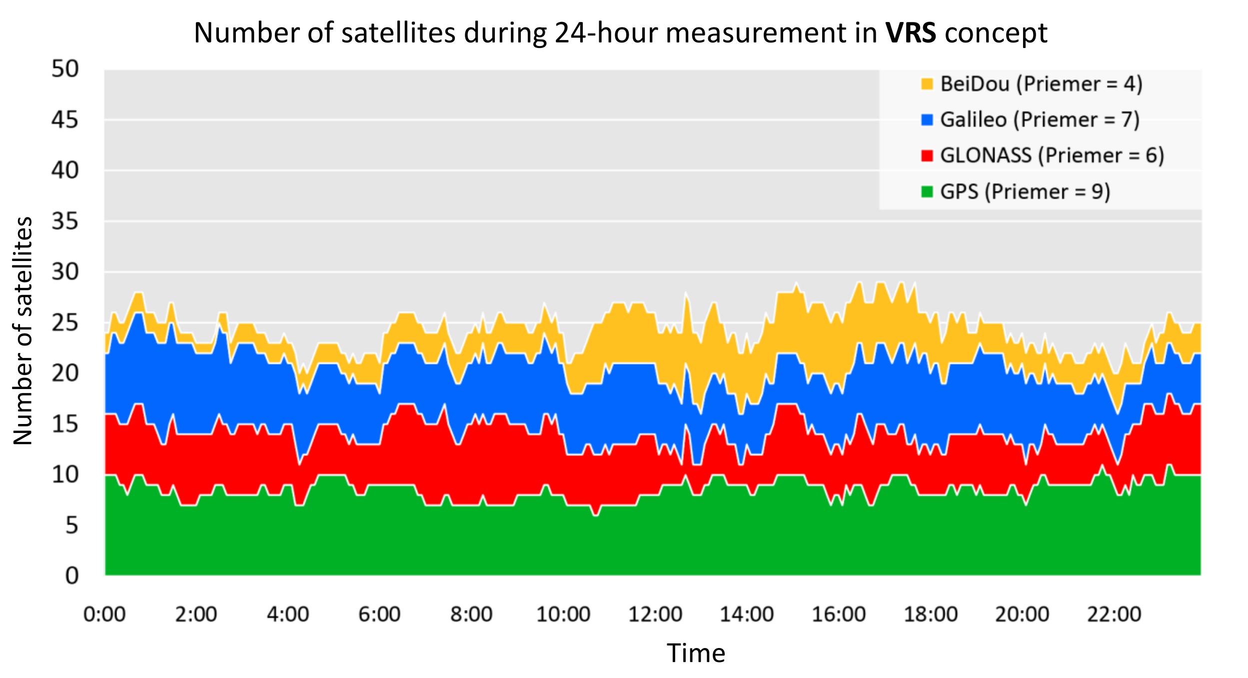
Nearest Reference Station concept

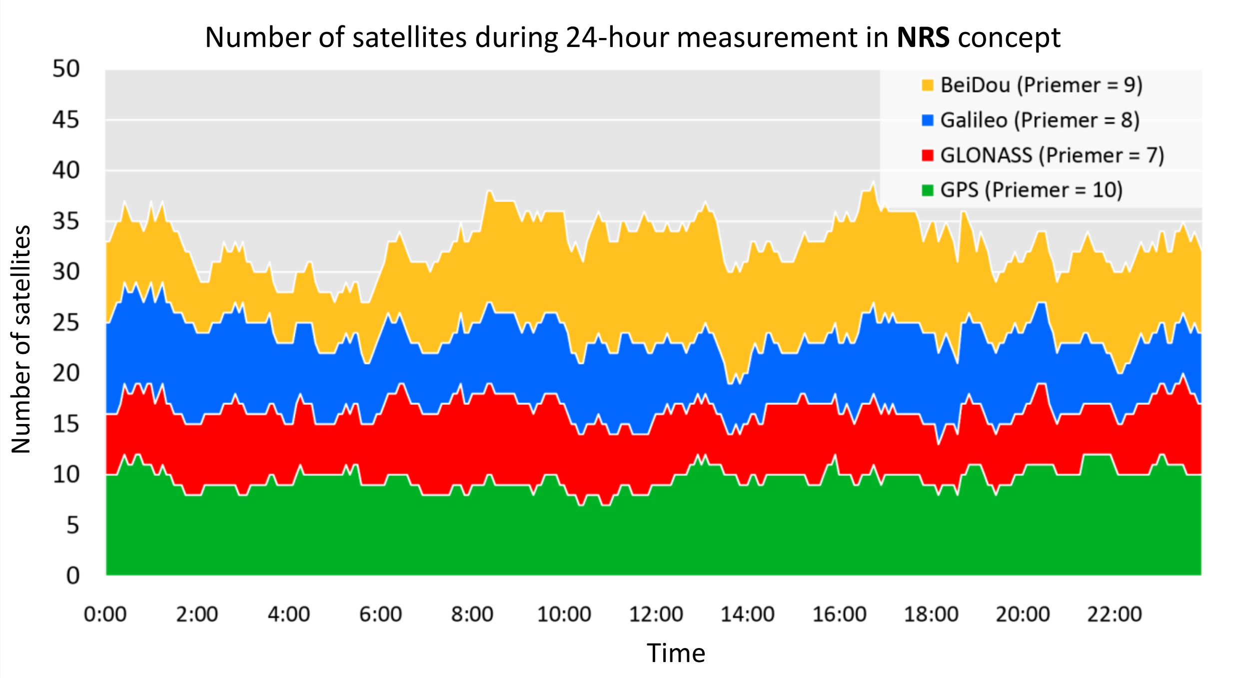
24-hour measurement

- VRS concept vs Nearest Reference Station
- 24-hour RTK measurement
- Two rovers side by side
- Difficult conditions under trees

Nearest Reference Station concept (NRS)

24-hour measurement





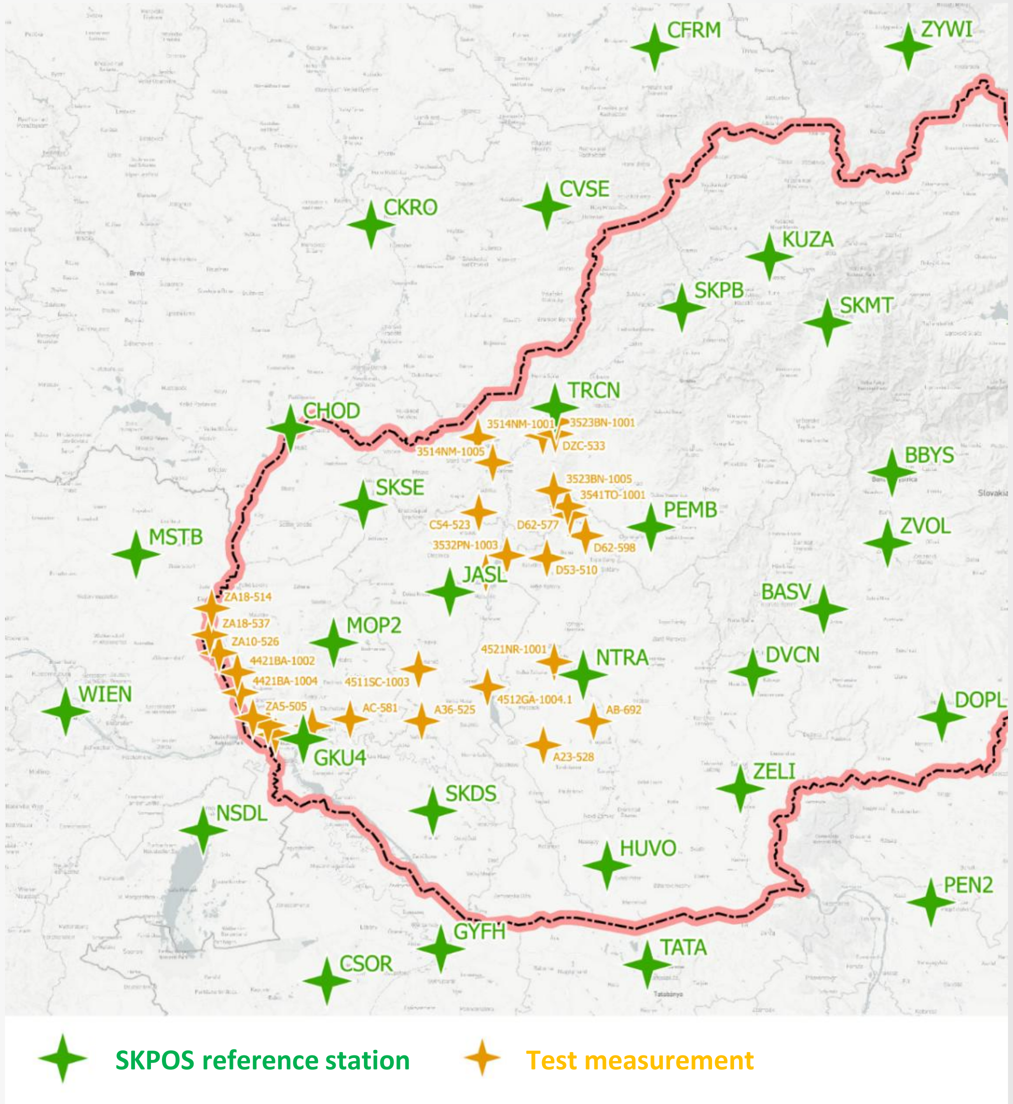
SKPOS
BeiDou-3

- **2018**
  Galileo and BeiDou-2
- **2021**
  Replacement of Trimble NetR9 with Trimble Alloy (3 unit)
- **2022**
  Replacement of Trimble NetR9 with Trimble Alloy (2 unit)
- **2023**
  Replacement of Trimble NetR9 with Trimble Alloy (14 unit)
- **2024**
  Replacement of Trimble NetR9 with Trimble Alloy (14 unit)
- **2024-05-13**
  BeiDou-3

BeiDou-3

Test on National Spatial Network points

- 30 National Spatial Network points
- RTK measurement with 2 minutes observation
- RTCM 3.2 MSM5
- Various measuring conditions



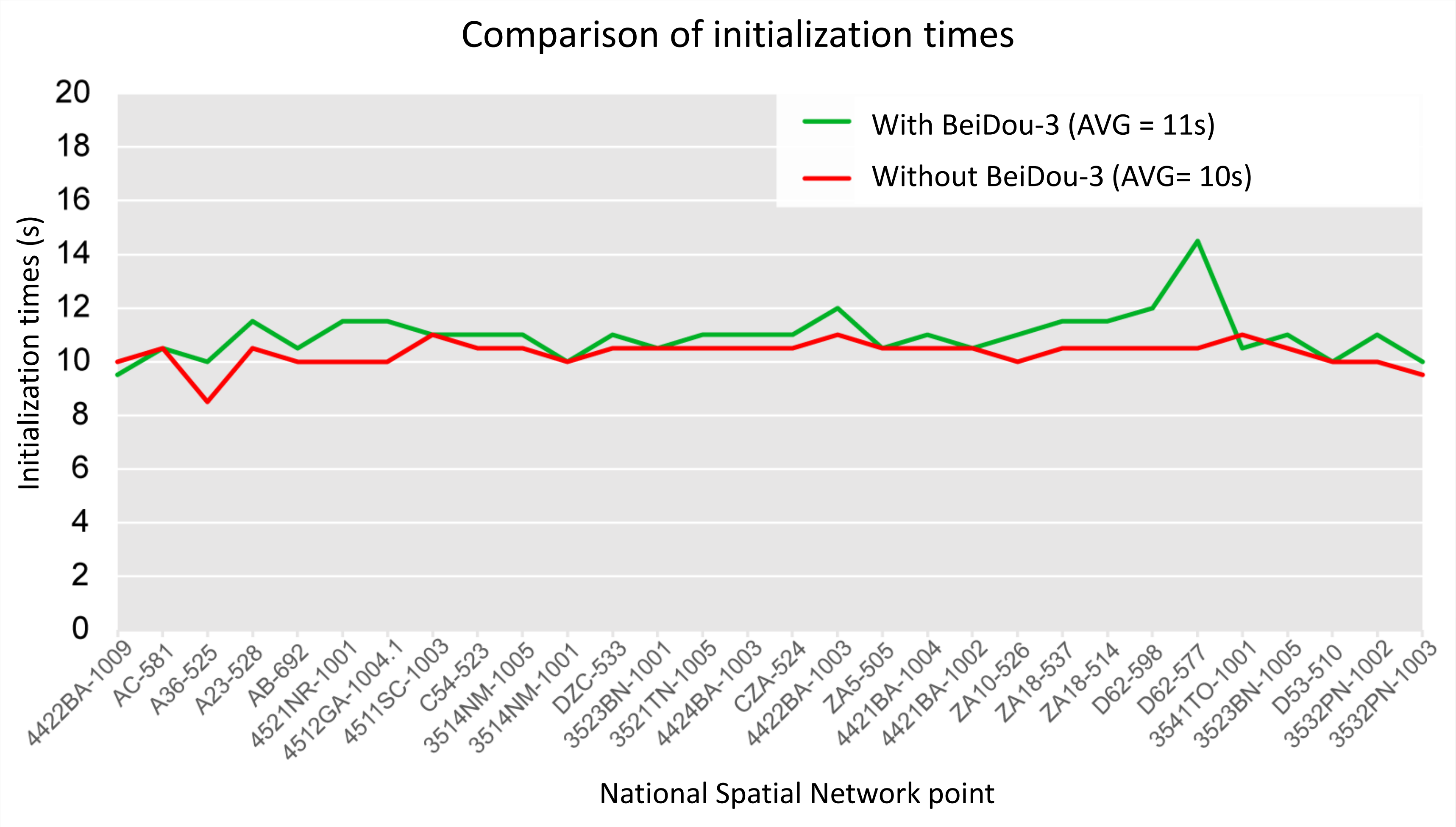
BeiDou-3

Test on National Spatial Network points

	Without BeiDou-3	With BeiDou-3
Initialization time	10 s	11 s
Number of satellites	23	30
Average PDOP	1.2	1.0
Average horizontal deviation	18 mm	17 mm
Average vertical deviation	31 mm	23 mm
Maximal horizontal deviation	47 mm	40 mm
Maximal vertical deviation	109 mm	79 mm

BeiDou-3

Test on National Spatial Network points



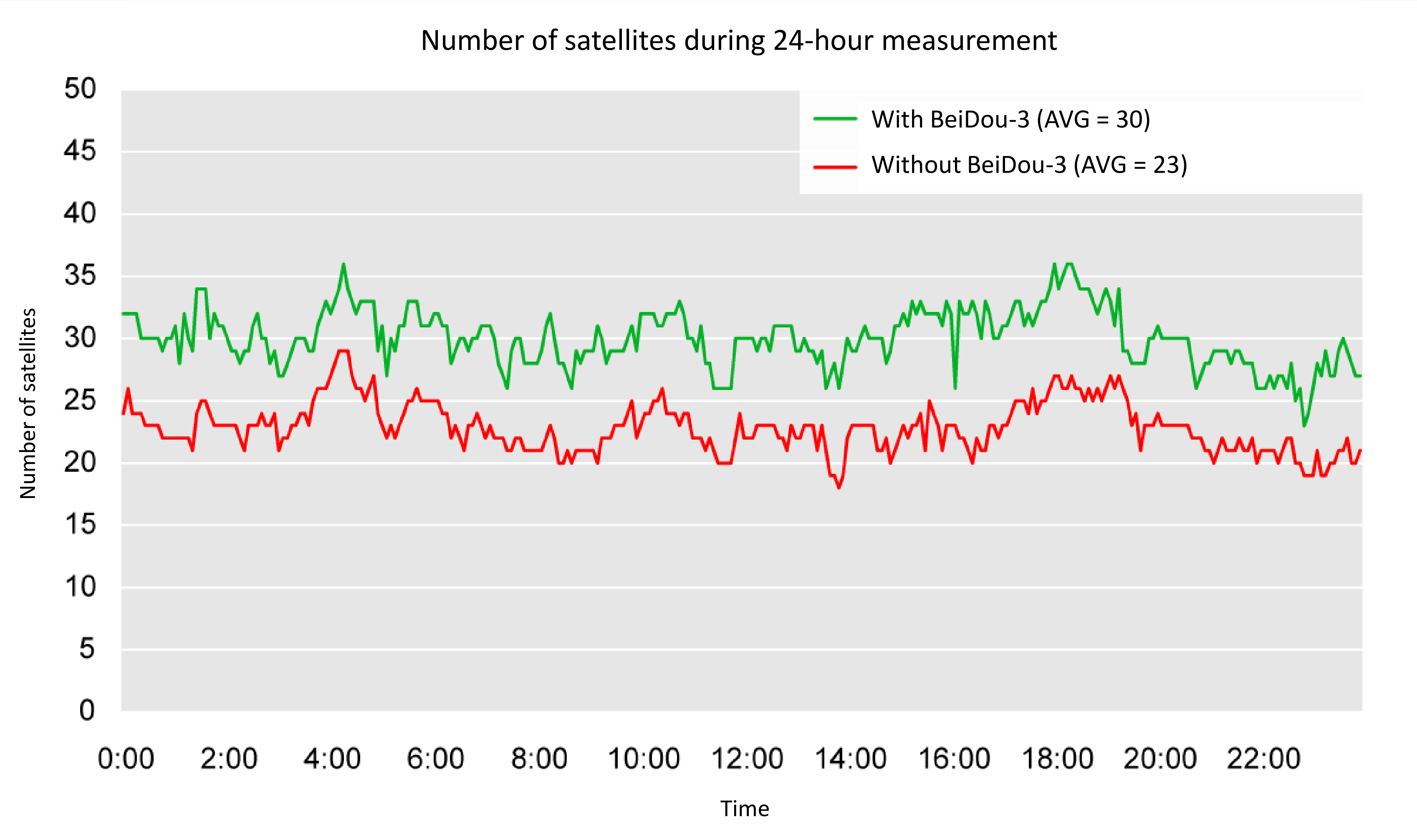
BeiDou-3

24-hour measurement

- 24-hour RTK measurement
- Two rovers side by side
- Difficult conditions under trees

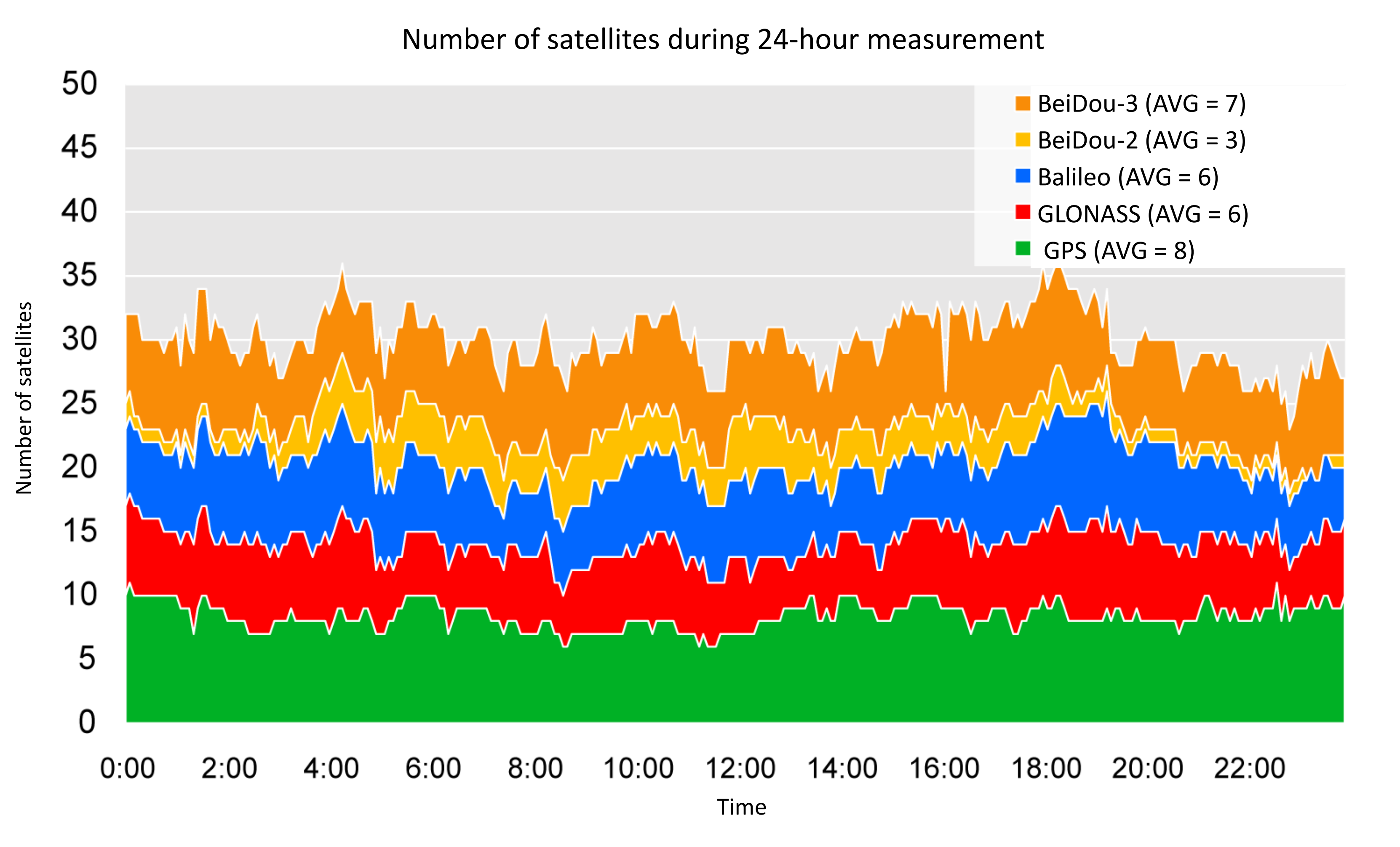
BeiDou-3

24-hour measurement



BeiDou-3

24-hour measurement



Conclusions

- Nearest reference station
  - 2 seconds shorter initialization time
  - +5 satellites
  - reducing the PDOP by 0.2
  - more outliers occur on 20+ km positions from the reference station
- BeiDou-3
  - 1 second longer initialization time
  - +7 satellites
  - reducing the PDOP by 0.2
  - same accuracy (coordinates)

SKPOS®

Thank you for your attention

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